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## CONDITIONS WHICH HAVE LED TO THE ESTABLISHMENT OF JUNIOR HIGH SCHOOLS.

BY HARRISON E. WEBB.

The junior high school is usually regarded as offering a solution of a very serious administrative problem in education. This problem can be properly characterized as American, as without question it arises from our ideals of freedom. It is also emphatically a *public-school* problem. Private schools have for years past so interwoven the respective curricula of public grammar schools and public high schools that in their practice these two domains of educational thought are hardly distinguishable.

In public-school systems, however, the line of demarcation between grammar-school and high-school organization, methods, and curricula is so plainly indicated that it has seemed to many to constitute a positive obstruction to the progress of pupils. We have grammar-school "commencements" and diplomas, as well as "alumni," and every assurance is presented to the thirteen-year-old youngster that in leaving grammar school he has completed something of importance. The student entering high school is called a "freshman," and is all too often invited to look back upon his grammar-school experience with disdain. Something of the same spirit of deprecation is unfortunately too often to be found in the minds of high-school teachers, in spite of the fact that a little careful study on their part of the work of the seventh and eighth grammar grades might in some cases reveal a superiority over their own methods of procedure which would prove little short of humiliating.

The junior high-school problem has, however, its larger aspects. The break between grammar school and high school undoubtedly comes at an unfortunate time for the pupil. In many states compulsory education laws require school attendance over a period which will include for most children the first high-school year. From the expiration of that period many children

must be kept in school, if at all, by methods which are borrowed from the book of the advertising expert. A deal of psychology is involved in this, of a sort which conflicts at all too many points with the principles of sound teaching. If the child leaves school when permitted by law, the loss to the school is charged up under the discreditable caption of "mortality." If he leaves school on "graduating" from the grammar grades, his condition is regarded as normal. (Just why this distinction is made is not clear to the writer.) It appears, however, that some change which would bring into accord the legal and pedagogical limits of *fundamental schooling* would be of considerable value.

It may also be the fact, though this has not been clearly established, that the period of adolescence might well be identified with a distinct administrative period in education.

A still larger problem, which is especially pertinent at the present time, is presented as the educational aspect of the eternal conflict of art and democracy, of efficiency and freedom. Our American tradition has at its base the doctrine, regarded as hopelessly false in many high places, that any child may be brought to do almost anything if properly taught. This prevailing sentiment contributes liberally to our list of failures, for reasons hardly necessary to state. Suffice it to say that the teacher who endeavors to direct the failures in his classes into channels which to him seem better suited to their natural aptitudes is too often regarded as endeavoring to conceal his own shortcomings.

The continental (European) ideal, on the other hand, has been to take full cognizance of these aptitudes of children, to stress them heavily in the educational process, and even to invent them when they are not perceptible. The school, in a word, is expected to make the child fit somewhere into the organization of society, and some higher power gives the final word as to how this shall be done. Errors in particular instances are overlooked, in favor of the well being of the whole state.

It is currently believed (or it was until the outbreak of the war) that the actual working out of this ideal in Europe resulted in an economy of at least two years in the educational process, as compared with our own order; this may be true, but the false conclusion has often been drawn that two years were

thus added to the maturity of a child of given age. Allowance should be made, moreover, for the fact that the English language, as at present constituted, contains so many horrible absurdities of spelling, pronunciation, and usage that a normal child might reasonably be expected to require for its mastery at least two years more than his European brother needs to acquire a like facility in the use of his native tongue. Our standards of physical measurement, too, are equally absurd and difficult of presentation. In the field of history also, it is necessary for American students to gain a fair knowledge, not only of America, but of the whole world; whereas in Germany and elsewhere, it appears, it has been felt that American history and its moral lessons might safely be disregarded.

All of which may well give us pause to consider whether those two years can really be saved at all in American schools. As an illogical result of our present political status, that slavish worship of German models, which has for a quarter century past characterized our educational theory, may be abruptly abandoned. Let us, as teachers, make it our high duty to substitute therefor a proper respect for the best in German educational thought, combined with the conviction that, as American teachers, we must work out our own salvation in our own way.

These administrative matters are, I fear, only too well known to all; but they will bear recapitulation.

Another factor, and a more potent one, which has given rise to the present-day demand for the junior high school or its equivalent, is the overcrowding of the secondary curriculum. It is a lamentable fact that at the present time we are endeavoring to crowd into the minds of our pupils much more than their brains can hold. This is partly due to the increased demands of American colleges, particularly in the field of mathematics, where they are worse than the proverbial daughters of the horse-leech. It is also due directly to the vast increase in the sum of human knowledge during the past half century—so great as to be almost immeasurable. There is another matter also to which particular attention should be directed.

In 1898 the famous report of the Committee of Ten led the way to the extension of the time devoted to required work in high-school English from three months to four years. At the

same time the classical or foreign language requirement was abated only slightly; the mathematical requirement was increased by the addition of several topics in algebra and an enormously increased emphasis upon original exercises in plane geometry; and courses in science which can properly be termed scientific, and are by so much the more difficult, were substituted for the forty weeks of this or that of the older order. The net result is, in the humble opinion of the writer, that only the exceptional student can be expected to attain the standards which are set for all; and that the greatly improved teaching methods of to-day, as compared with those of thirty years ago, are wasted upon an attempt to achieve the impossible. The result has been a lowering of standards and a weakening of intellectual discipline all along the line. It is greatly to be doubted if the junior high school will correct this error. The better solution is a much simpler one—the reduction of the college requirement to a single foreign language, ancient or modern. Four years at least of a modern foreign language are essential to any facility in its use. And four years of an ancient language should be ample as a substitute for this in the case of students whose college work is to lie in the field of the classics. Until this is done, mathematics, in its broader cultural and useful aspects, can hardly be expected to take its true place in high-school curricula. Until the polyglot ideal is definitely abandoned, with its train of exclusiveness and superficiality, it is doubtful if that earnestness, sincerity, and assurance which are so characteristic of mathematical study can ever make their mark upon the collective intellect of our student body. There is little likelihood that the junior high school, by extending the high-school course downward into two more years of immaturity, can obviate the necessity of this modification.

Until this can be done, it becomes our duty to unify the mathematical instruction of grammar school, high school, and college as perfectly as possible. In fulfilling this duty, much remains to be done. Most important of all, perhaps, is the thorough grounding of high-school teachers in the fundamental principles of arithmetic. It is safe to say that only the more recent graduates of larger universities enter the teaching profession with this equipment. For the rest of us arithmetic is a dim memory of childhood's happy hours.

Now arithmetic has its generalizations, as well as algebra and geometry. Arithmetic differs from algebra chiefly in that these generalizations are presented explicitly. Algebra, on the other hand, employs the symbolism of literal expression, and by so doing makes more clear the essential steps in inverted processes, and so leads the way to a study of types of equation and to infinite series. Geometry employs the symbolism of physical extent, and so broadens the number field enormously, and permits of the drawing of conclusions from an extended list of theorems.

It is a fact, however, that many of the explicit generalizations of arithmetic are very difficult of comprehension, in spite of their palpable usefulness in practice. At present many of these principles are lost sight of as a result of dissociating grammar-school arithmetic and secondary-school algebra. The grammar-school "graduate" must be prepared to employ a few simple arithmetical processes with ease and accuracy. The high-school "freshman" requires considerable time and attention in order that he may in a few weeks become thoroughly familiarized with a new symbolic notation. By this procedure progressive standards of intricacy of process have gradually come to be substituted for the mastery of fundamental principles as the aim of the secondary algebra course. And when these standards have been attained, it is the established custom to send the pupils careering through the refinements of Euclidean logic, with little or no emphasis upon the mathematical or practical content of a proper course in geometry.

It would appear, though the statement requires substantiation, that at present an excessive amount of time is devoted in grammar schools to relatively simple arithmetical operations, and that the purposes of thorough drill are defeated through excessive iteration. Arithmetic has changed from a hard subject into a tiresome one. Accuracy, the universal demand of employers and others, can be inculcated to some extent by continued drill and repetition. But it is also functioned by discipline, and it may well be questioned whether the decreased content, with consequent repetitions, of grammar school arithmetic has not come about as a result of the relaxed intellectual discipline which follows naturally from the application of "development methods" in primary education.

The junior high-school course of two or three years, so arranged as to include the customary first year of algebra, will meet this situation, provided some method is devised by grammar-school authorities for improvement in accuracy in the first six grades. If this is well done, the seventh, eighth, and ninth years should be devoted to generalized mathematics, and should include the *principles* of arithmetic, symbolic form of expression, "informal" geometry, elementary equations and problems, and a wide field of applications. The junior high-school mathematical course should be a unit in itself. Probably it will not be practicable to crowd into it matter which is now given in the last three years of the high-school course. It offers no place for Euclidean method. Theorems and corollaries should be taboo. Much that is now presented in "first-year algebra" may of necessity be postponed to the senior high school, or omitted entirely. But the way is open in the junior high school to make mathematics an interesting and vital factor in elementary education.

It is desirable also to consider at this time the possibility of establishing a continuity of subject matter during the seventh, eighth and ninth years, even when local conditions interfere with the establishment of junior high schools as educational units. It should be practicable in a large city system for eighth-grade teachers and high-school teachers to reach a common interest in this field through conferences, supervision, and the arrangement of suitable curricula.

In considering the junior high-school mathematical course, administrative authorities should bear constantly in mind its experimental character, and allow considerable latitude to teachers in carrying out any organized plan.

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